IN THE ABSTRACT

An accelerator comprises a plurality of accelerating cells arranged to convey a beam, adjacent cells being linked by a coupling cell, the coupling cells being arranged to dictate the ratio of electric field in the respective adjacent accelerating cells, at least one coupling cell being switchable between a positive ratio and a negative ratio. Such an accelerator in effect inserts a phase change into the E field by imposing a negative ratio, meaning that the beam will meet a reversed electric field in subsequent cells and will in fact be decelerated. As a result, the beam can be developed and bunched in early cells while accelerating to and/or at relativistic energies, and then bled of energy in later cells to bring the beam energy down to (say) between 100 and 300 KeV. Energies of this magnitude are comparable to diagnostic X-rays, where much higher contrast of bony structures exists. Hence the accelerator can be used to take kilovoltage portal images.